United States Patent [19]

Bowen

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[54] **METHOD FOR OBTAINING STRONG ADHESIVE BONDING OF COMPOSITES TO DENTIN ENAMEL AND OTHER SUBSTRATES**

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[58] **Field of Search** 424/147, 295; 106/35; 523/115, 116, 114; 548/433; 433/228; 260/998.11

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[57] **ABSTRACT**

Materials and methods for improving the adhesion of composite materials and resins to dentin, enamel and other substrates are disclosed. Preferably, the substrate is treated with an aqueous solution of at least one acidic salt containing a polyvalent cation which preferably is capable of changing valence by unit steps (univalent changes) and which can bind to dentin or enamel surface sites, and at least one anion which preferably forms a relatively water-insoluble precipitate or precipitates with calcium, and which contains at least one carboxyl group and preferably two or more carboxyl groups. The resultant surface is then treated with a solvent containing at least one compound selected from the group consisting of (1) the adduct of N(p-tolyl)glycine and glycidyl methacrylate ("NTG-GMA"), and (2) the addition reaction product of N-phenylglycine and glycidyl methacrylate ("NPG-GMA"). Finally, a solution is applied which contains at least one compound selected from the group consisting of (1) the addition reaction product of pyromellitic acid dianhydride and 2-hydroxyethyl methacrylate ("PMDM"), (2) the addition reaction product of 3,3',4,4'-benzophenonetetracarboxylic dianhydride and 2-hydroxyethyl methacrylate ("BTDA-HEMA"), and (3) 4-methacryloxyethyltrimellitic anhydride ("4-META"). Alternative embodiments are also set forth.

38 Claims, No Drawings